



California Regional Water Quality Control Board

Los Angeles Region



Linda S. Adams
Cal/EPA Secretary

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Arnold Schwarzenegger
Governor

February 15, 2008

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Mr. Robert Scott
Boeing Realty Corporation
4501 Conant Street
Long Beach, CA 90808

APPROVAL OF REVISED MONITORING AND REPORTING PROGRAM CI-9310, INDIVIDUAL WASTE DISCHARGE REQUIREMENTS ORDER NO. R4-2007-0040, BOEING CORPORATE REAL ESTATE, FORMER C-6 FACILITY, 19503 SOUTH NORMANDIE, LOS ANGELES, CALIFORNIA (FILE NO. 95-036; SLIC NO. 0410; SITE ID NO. 1846000)

Dear Mr. Scott:

We have received the *Addendum No. 2 to Building 1/36 (Parcel C) Source-Area Groundwater In-Situ Reactive Zone Pilot Study Work Plan, Request to Include Well WCC_06S as a Contingency Extraction Well* (Letter) dated January 11, 2008, and *Addendum No. 2 to Building 2 to the In-Situ Reactive Zone Pilot Study Work Plan C-Sand Bioremediation Amendment Injections* (Work Plan Addendum) dated January 25, 2008, both prepared by CDM. We have reviewed the Letter and Work Plan Addendum and have the following comments:

FORMER BUILDING 1/36 AREA

1. On August 9, 2007, an Individual Waste Discharge Requirements (WDR) permit was granted to Boeing Realty Corporation (Boeing) to inject electron donor amendment and bioaugmentation culture, which involves the addition of selected non-pathogenic (naturally derived, not genetically engineered) chlorinated ethene-degrading *Dehalococcoides ethenogenes* culture (referred to as Shaw's SDC-9™ culture, or SiREM's KB-1™) in select areas to facilitate reductive dechlorination of chlorinated volatile organic compounds, with groundwater extraction to remediate shallow groundwater underlying the former Building 1/36 source area. This approach is referred to as Biorecirculation.
2. The Individual WDR and monitoring and reporting program (MRP) specify EWB001 as the only extraction well to be used during the pilot testing activities. During system startup activities for the biorecirculation pilot test, a sustained flow of less than 1 gallon per minute (gpm) was observed from EWB001, which is substantially less than the anticipated design flow of 12 gpm. Since then, Boeing has been implementing actions to increase the groundwater production rate for the pilot system close to the design or other suitable rate that would achieve the objectives of the biorecirculation pilot test.
3. Based on the startup data collected, the Letter proposes to revise the MRP CI-9310 to include WCC_06S as an additional contingency extraction well for the biorecirculation pilot study. Currently WCC_06S is one of the treatment zone performance monitoring wells (designated as Group B). WCC_06S will continue to be monitored and sampled per the MRP. We have reviewed the information submitted and concur with Boeing's proposal to revise the MRP to include WCC_06S as a contingency extraction well for the biorecirculation pilot study activities.

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BOE-C6-0187987

FORMER BUILDING 2 AREA

1. Boeing submitted a "Building 2 In-Situ Reactive Zone Pilot Test Workplan" (Arcadis Building 2 Work Plan), prepared by Arcadis, dated August 15, 2001. On November 6, 2002, the Regional Board approved an "Addendum to the Building 2 In-Situ Reactive Zone Pilot Test Work Plan" (Addendum, dated July 31, 2002). On February 4, 2003, the Regional Board Executive Officer determined that the proposed discharge meets the conditions specified in Regional Board Order No. R4-2002-0030 "General Waste Discharge Requirements for Groundwater Remediation at Petroleum Hydrocarbon Fuel and/or Volatile Organic Compound Impacted Sites" (General WDR).
2. Infrastructures including injection/amendment wells and piping were installed between May and September 2003 at Building 2. In general, the injection well networks were designed to treat trichloroethene (TCE) concentrations in excess of 5 milligrams per liter (mg/l) in groundwater beneath the source areas. The pilot study was proposed to be conducted by injecting a carbohydrate solution consisting of 13% molasses and potable water into the injection well networks. Amendment injections were initiated at the site in 2004; however, technical difficulties prompted a review of the selected amendment and injection methods and no further amendment injections have been conducted at the site since the fourth quarter 2004. On June 7, 2007, the Regional Board issued a letter rescinding the General WDR. Therefore, any additional injection activities to be conducted in the Building 2 Area will be covered under the approved Individual WDR. Prior to implementing any such additional injections, the Discharger is required to submit a work plan addendum for the Regional Board approval.
3. The Individual WDR issued on August 9, 2007, provided options to continue periodic slug injections or initiate biorecirculation as part of additional pilot studies at the Building 2 area using a combination of existing injection well network and new infrastructure. The Work Plan Addendum submitted presents the activities proposed for the C-Sand aquifer at the Building 2 area which includes additional injections of electron donor in the existing C-Sand wells to maintain/enhance conditions supportive of biodegradation and bioaugmentation in order to enhance the biodegradation (dechlorination) of contaminants.
4. The main objective of the C-Sand amendment injections is to verify the effectiveness of bioremediation with bioaugmentation to further reduce VOC concentrations and mass in groundwater beneath the Building 2 area and enhance the reductive dechlorination process. The overall approach consists of performing an initial round of slug injections into the existing C-Sand amendment wells using sodium lactate solution and bioaugmentation. Baseline monitoring will be performed prior to injection, and periodic performance monitoring will be conducted at existing monitoring wells.
5. We have reviewed the information submitted and concur with Boeing's proposal to continue periodic slug injections and/or initiate biorecirculation as part of additional pilot studies at Building 2 area. The electron donors and bioaugmentation cultures proposed to be injected in groundwater beneath the Building 2 area are all approved for use at the site under the Individual WDR. Monitoring to be performed in support of the slug injections for the Building 2 area will be incorporated into the revised MRP CI-9310 (attached).



Mr. Scott
Boeing Realty Corporation

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February 15, 2008


Section 13263 (e) of the California Water Code provides that all Requirements shall be reviewed periodically and, upon such review, may be revised by the Regional Board. Regional Board staff has reviewed the information provided and concurs with Boeing's following proposals: 1) revise the MRP to include WCC_06S as a contingency extraction well for the biorecirculation pilot study activities for the Building 1/36 area and 2) continue periodic slug injections and/or initiate biorecirculation as part of additional pilot studies at Building 2 area. Attached please find Revised Monitoring and Reporting Program CI-9310 dated February 13, 2008, which supersedes the Monitoring and Reporting Program dated August 9, 2007. This revised monitoring and reporting program includes the changes made to the Building 1/36 area groundwater monitoring program and the Building 2 area groundwater monitoring program including the sampling schedule, reporting frequency and figures.

The Revised Monitoring and Reporting Program requires you to implement the monitoring program on the effective date of this Order. All monitoring reports should be sent to the Regional Board, ATTN: INFORMATION TECHNOLOGY UNIT.

When submitting monitoring or technical reports to the Regional Board per these requirements, please include a reference to **Compliance File No. CI-9310** and **Order No. R4-2007-0040**, which will assure that the reports are directed to the appropriate file and staff. Please do not combine your discharge monitoring reports with other reports. Submit each type of report as a separate document.

Please call Ms. Ana Townsend at (213) 576-6738, or Ms. Su Han at (213) 576-6735 if you have any questions.

Sincerely,


Tracy J. Egoscue
Executive Officer

Attachment: Revised Monitoring and Reporting Program CI-9310, dated February 15, 2008

cc: Jeffrey Dhont, United States Environmental Protection Agency, Region 9
John Youngerman, State Water Resources Control Board, Division of Water Quality
Kurt Souza, State Department of Health Services, Drinking Water Field Operations Branch
Brian Hooper, Los Angeles County Department of Public Works, Waste Management Division
Carl G. Brooks, South Coast Air Quality Management District
Mark Stuart, California Department of Water Resources, Watermaster, Central Basin,
Ted Johnson, Water Replenishment District of Southern California
Cheryl Ross, West Basin Municipal Water District
Los Angeles County Department of Health Services, Environmental Health
Alex P. Carlos, Regional Water Quality Control Board, Region 4
Ravi Subramanian, CDM
Joseph Weidmann, Haley & Aldrich

California Environmental Protection Agency



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BOE-C6-0187989

**STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION**

MONITORING AND REPORTING PROGRAM NO. CI-9310

**FOR
BOEING CORPORATE REAL ESTATE
(formerly BOEING REALTY CORPORATION)
FORMER C-6 FACILITY**

FILE NO. 95-036

The Discharger shall implement this monitoring and reporting program on the effective date of this Order.

I. GROUNDWATER MONITORING PROGRAM

The former Building 1/36 biorecirculation pilot test was initiated in the First quarter of 2008 and, former Building 2 periodic slug injections will be initiated in the Second quarter of 2008. The following groundwater wells and amendment points will be included in the sampling program:

Former Building 1/36 Biorecirculation Pilot Test

Group A

Group A1: AW0066UB and AW0067UB

Group A2: AW0064UB and AW0065UB

Group B

Group B1: AW0075UB, AW0076UB, AW0077UB, EWB002, and AW0073C

Group B2: WCC_06S and AW0074UB

Group C: TMW_07 and WCC_12S

Group D: AW0055UB

Former Building 2 Periodic Slug Injections

Group A: IRZC001, and IRZC0003 through IRZC0020

Group B: CMW026, IRZCMW003, IRZCMW002 and MWC024

Group C: CMW002

Group D: IRZCMW001

Figure 1 shows the location of the Site. Groundwater well and amendment point locations at the Site that will be used for the Building 1/36 pilot test are shown on attached Figure 2 and for the Building 2 periodic slug injections on attached Figures 3 and 4. Group A sampling points, for both areas, are amendment points where donor will be introduced. Due to the lower than anticipated flow from extraction well EWB001, Group A1 sampling points are amendment points where donor is planned to be introduced initially. Group A2 sampling points are backup amendment points where donor could be introduced in the event of higher flow from EWB001 or from the contingency extraction well WCC_06S or addition of another extraction well (to be decided based on evaluation of system operation). Group B wells, for both areas, consist of monitoring wells that are located within the treatment zone, which will be used to evaluate

electron donor consumption and distribution and the effectiveness of the biologically active zones over time. For the Building 1/36 pilot test, all Group A and B wells will be used for performance monitoring purposes as follows:

- When donor is introduced in Group A1 wells, only Group B1 wells will be monitored per the table below.
- When donor is introduced in Group A1 and Group A2 wells, then all Group B wells (B1 and B2) will be monitored per the table below.

For the Building 2 periodic slug injections, only Group B wells will be used for performance monitoring purposes, as Group A wells are not exposed to surface and therefore are not accessible for sampling. The Group C sampling points are downgradient sample locations, and Group D points are upgradient sample locations, for both areas.

Baseline sampling will take place prior to injection and will include at least one event for the Building 1/36 pilot test and the Building 2 periodic slug injections. The samples will be analyzed for field parameters (oxidation-reduction potential [ORP], dissolved oxygen [DO], pH, specific conductance, temperature, turbidity and groundwater elevation), chlorinated volatile organic compounds (VOCs), dissolved hydrocarbon gases (methane, ethane, and ethene), total organic carbon (TOC), volatile fatty acids (VFAs), alkalinity, ferrous iron by field kit, anions (sulfate and chlorides), and bacterial DNA analysis by Quantitative Polymerase Chain Reaction test (qPCR). If a tracer test is conducted, samples will be analyzed for bromide too.

The required constituents to be analyzed and the monitoring schedule for each sample group for the Building 1/36 pilot test and periodic slug injections at Building 2 are shown below.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS – BUILDING 1/36 PILOT TEST	MINIMUM FREQUENCY OF ANALYSIS – BUILDING 2 SLUG INJECTIONS
Total Daily Injections	Liters or Gallons	Measurement	Per injection	Per injection
Groundwater Elevation	Feet below ground surface (bgs)	In situ	Groups A1 and B1 OR A and B: Baseline, monthly following injection for first six months, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups A1 (or A)-D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups B-D: Semi-annually after Year 1
Field Parameters (DO, ORP, pH, Temperature, Specific Conductance, and Turbidity)	mg/l, millivolts, pH units, degrees C, µS/cm, and NTU, respectively	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups A1 (or A)-D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Group B-D: Semi-annually after Year 1
Chlorinated Volatile Organic Compounds (EPA Method 8260B)	µg/l	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups A1 (or A)-D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups B-D: Semi-annually after Year 1

Total Organic Carbon (EPA Method 9060 Modified or equal)	mg/l	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups A1 (or A)-D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Group B-D: Semi-annually after Year 1
Volatile Fatty Acids	mg/l	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups A and B: No analysis for Year 2 Groups C and D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Group B: No analysis for Year 2 unless additional injections are conducted Groups C and D: Semi-annually after Year 1
<i>Dehalococcoides</i> spp. strains (Quantitative Polymerase Chain Reaction test [qPCR])	gene copies/mL	Grab	Group A1 OR A: Baseline and semi-annually post injection for Year 1 Group B1 OR B: Baseline, quarterly following injection for first six months, semi-annually for rest of Year 1 Groups C and D: Baseline and Semiannually for Year 1 Groups A and B: No analysis for Year 2 Groups C and D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and semi-annually for Year 1 Group B: No analysis for Year 2 unless additional injections are conducted Groups C and D: Semi-annually after Year 1
Dissolved Metals (Ferrous Iron by field kit), Alkalinity, and Anions (sulfate, nitrate, nitrite and chlorides)	mg/l	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, and quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for rest of Year 1 Groups A and B: No analysis for Year 2 Groups C and D: Semi-annually only for chlorides after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Group B: No analysis for Year 2 unless additional injections are conducted Groups C and D: Semi-annually only for chlorides after Year 1
Total Dissolved Solids (TDS)	mg/l	Grab	Groups C and D: Quarterly following injection for Year 1, semi-annually after Year 1	Groups C and D: Baseline, quarterly following injection for Year 1, semi-annually after Year 1
Dissolved Hydrocarbon Gases (ethane, ethane, and methane)	mg/l	Grab	Group A1 OR A: Baseline and quarterly post injection for Year 1 Group B1 OR B: Baseline, monthly following injection for first six months, and quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for rest of Year 1 Groups A1 (or A)-D: Semi-annually after Year 1	Group B: Baseline, Month 1 and Month 3 following injection, quarterly for rest of Year 1 Groups C and D: Baseline and quarterly for Year 1 Groups B-D: Semi-annually after Year 1

All groundwater monitoring reports must include, at minimum, the following:

- Well identification, date and time of sampling;
- Sampler identification, and laboratory identification; and
- Semi-annual observation of groundwater levels, recorded to 0.01 feet mean sea level and groundwater flow direction.

II. AMENDMENT INJECTION MONITORING REQUIREMENTS

The reports shall contain the following information regarding injection activities:

1. Depth of injection points;
2. Quantity of amendment injected and dates injected; and
3. Total amount of amendment injected.

III. REPORTING REQUIREMENTS

The first monitoring report for Building 1/36 pilot test under this Program was due July 30, 2007. The first monitoring report for Building 2 periodic slug injections under this Program is due by July 30, 2008. This monitoring and reporting program supercedes previous requirements stated in work plan approval letters. The monitoring and reporting program provided herein for Building 2 periodic slug injections may change based on when injections are actually initiated. Any such changes will be provided in a revised monitoring and reporting program.

The Discharger is required to submit a final report including baseline and donor injection data, plus quarterly and semi-annual reports (as provided below) for the duration of the Building 1/36 pilot test and Building 2 periodic slug injections. If necessary, semi-annual monitoring reports will be submitted for each additional year. The groundwater monitoring wells and amendment points will be gauged and sampled, and results will be reported to the Regional Water Quality Control Board (Regional Board) under this Monitoring and Reporting Program according to the following schedules:

Building 1/36 Pilot Test

Reporting Period	Sampling Month(s)	Report Due Date
April – June 2007	May and June 2007 (Baseline Events)	July 30, 2007
July – September 2007	None (No injections performed)	October 30, 2007
October – December 2007	December 2007 (2nd Baseline Event for EWB002)*	January 30, 2008
January – March 2008	January, February, and March 2008	April 30, 2008
April – June 2008	April, May, and June 2008	July 30, 2008
July – December 2008	August and November 2008**	January 30, 2009
January – June 2009	May 2009	July 30, 2009
July – December 2009	November 2009	January 30, 2010

* - Building 1/36 pilot test was started up on December 17, 2007 and operated until December 21, 2007. Electron donor was injected as part of the startup operations. The first monthly sampling event associated with the pilot test will be performed in January 2008.

** - Sampling schedules were slightly modified to match up with Building 2 sampling events

Building 2 Periodic Slug Injections

Reporting Period	Sampling Month(s)	Report Due Date
January – June 2008	March or April 2008 (Baseline Event) June 2008 (Month 1)*	July 30, 2008
July – September 2008	August 2008 (Month 3)	October 30, 2008
October 2008 – March 2009	November 2008 and February 2009	April 30, 2009
April – September 2009	May 2009	October 30, 2009
October 2009 – March 2010	November 2009	April 30, 2010
April – September 2010	May 2010	October 30, 2010

* - The first round of sampling for Building 2 will be initiated in the month following the completion of the initial round of slug injections (expected to be completed by May 2008).

The Discharger shall submit Reports detailing the results of the Building 1/36 pilot test and Building 2 periodic slug injections. Where the reporting deadlines for Building 1/36 and 2 falls on the same dates, one single report combining the activities at both areas should be submitted. The reports should include an evaluation of the effectiveness of using the amendment solution to remediate VOC-contaminated groundwater at the Site, the impact of any by-products on the receiving groundwater quality, and any other effects the *in-situ* treatment may have. The Discharger is required to submit the following reports pursuant to their respective due dates:

Building 1/36 Pilot Test

Report	Due Dates
Final Report	January 30, 2010

Building 2 Periodic Slug Injections

Report	Due Dates
Final Report	October 30, 2010

If there is no discharge or injection during any reporting period, the report shall so state. Monitoring reports must be addressed to the Regional Board, Attention: Information Technology Unit.

Whenever wastes associated with the discharge under this Order are transported to a different disposal site, the following shall be reported in the monitoring report: type and quantity of wastes; name and address of the hauler (or method of transport if other than by hauling); and location of the final point(s) of disposal and copies of waste manifest.

IV. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the ____ day of _____ at _____.

(Signature)

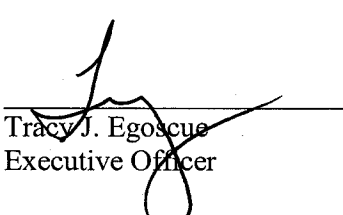
(Title)"

V. MONITORING FREQUENCIES

Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

These records and reports are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Ordered by:


Tracy J. Egoscue
Executive Officer

Date: February 15, 2008



January 21, 2008

CDM

Legend

 Former C-6 Facility

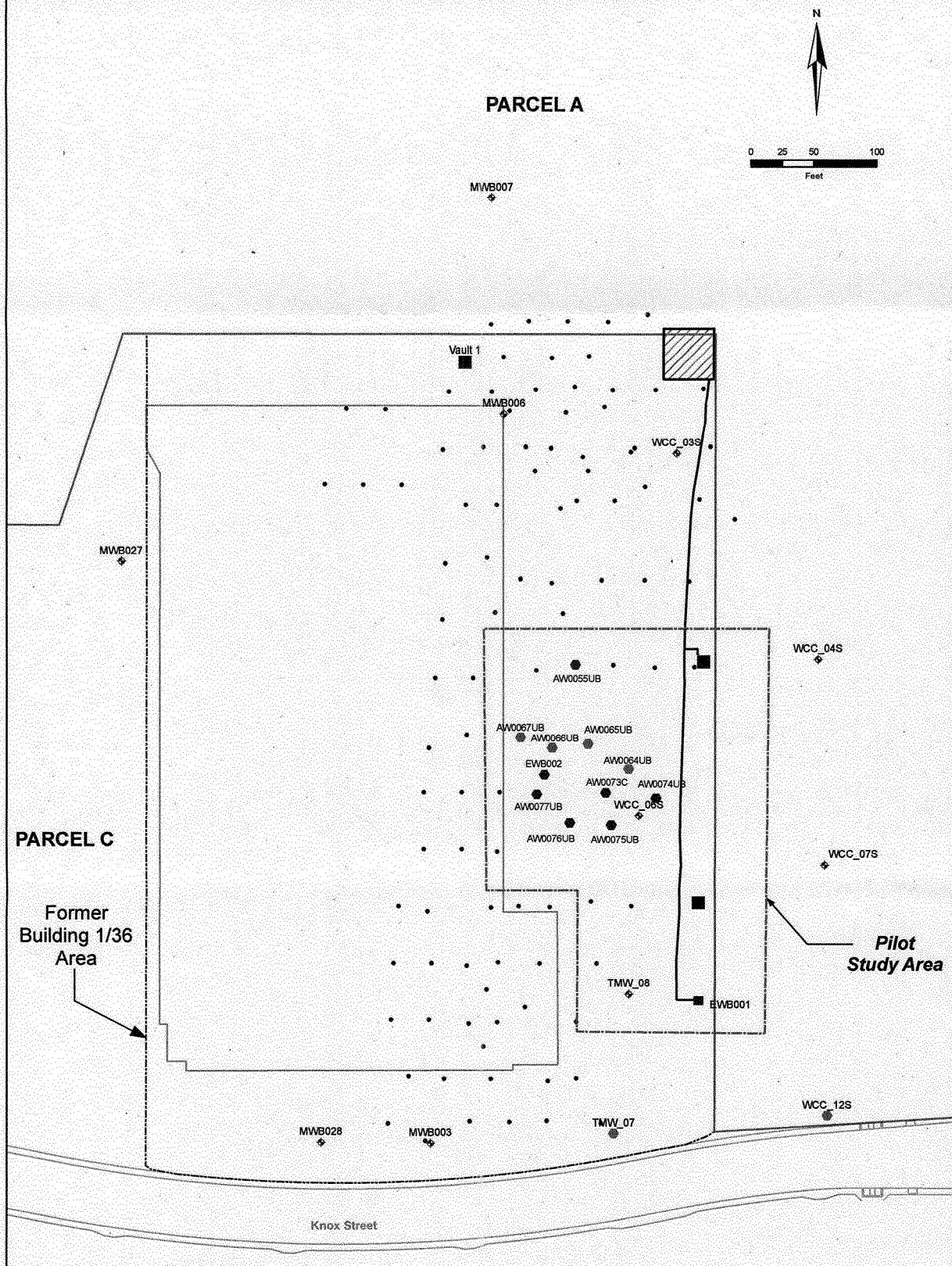
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Boeing Corporate Real Estate
Former C-6 Facility
Site Vicinity Map

Figure 1

NOTE:

1. Existing well vaults and conveyance piping, as shown, will be used to transport extracted groundwater to the treatment compound and amended water back to select amendment wells.
2. A limited subset of the existing amendment and monitoring wells will be used for the pilot study.



January 11, 2008

CDM

Legend

- Parcel Boundary
- Existing Compound
- Existing Vault
- Existing Electrical Conduit and Water Piping
- B-Sand Amendment Well
- B-Sand Extraction Well
- B-Sand Monitoring Well
- Group A Amendment Well (Upper B-Sand)
- Group B Monitoring Well ((6) Upper B-Sand and (1) C-Sand)
- Group C Downgradient Well (B-Sand)
- Group D Upgradient Well (Upper B-Sand)

Figure 2
Boeing Corporate Real Estate
Former C-6 Facility
**Building 1/36 Biorecirculation
Pilot Study Well Layout**

